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I – SECTOR AND ISSUES

1.1 - Presentation of the sector

Jordan is located in the Mediterranean Basin to the east of the Jordan River and has a surface area of roughly 89,210 km². Its topographical features are variable and its climate is arid to semi-arid with a short rainy winter and long dry summer.

The Hashemite Kingdom of Jordan is recognised as being one of the most water-scarce countries in the world. The water scarcity has become recurrent and meeting water needs constitutes a real challenge. Jordan is experiencing a real “water crisis” as the available resources cannot fully satisfy demand.

In Jordan, annual renewable freshwater reserves are estimated at less than 800 million m³ and mainly consist of surface water and groundwater. In a country where renewable water reserves are overexploited and where most of the capital’s inhabitants are only supplied with water once a week, the only option is to rely on non-conventional water resources (desalination and wastewater reuse). There are few alternatives for increasing water supply; additional quantities of rainwater can be collected and brackish water can be pumped from the sandstone aquifers.

The quantity of available water per person is one of the lowest in the world and is continuing to decline. It is forecast to fall from the current level of 145 m³ per person per year to 90 m³ per person per year by 2025 if there are no large-scale desalination projects, such as the one to convey water from the Red Sea to the Dead Sea, which will supply the region with 850 million m³ a year. It will only be possible to implement this project in a distant future.

1.2 – Government policy

The Jordanian authorities are resolved to address this situation by improving the distribution of water resources between agricultural, industrial and domestic demand and using them more efficiently. A “National Water Strategy” has been adopted for the period 2008-2022 at the request of the King. While this strategy includes the implementation of demand management measures and investments to reduce losses, it also focuses on a supply-based rationale due to the fact that if there are no new resources, a persistent annual deficit of 500 million m³ is forecast by 2020.

In addition, the water strategy stresses the need to exploit the full potential of surface water and groundwater at a reasonable level. It is mainly to be used for drinking water consumption. Poor quality water, treated wastewater and brackish water are to be used for irrigated agriculture. Seawater desalination will also produce an additional resource for cities and industrial and commercial use.

This strategy also provides for the collection and treatment of all collected wastewater. This allows poor quality wastewater to be obtained, which can be reused for agriculture or other non-domestic purposes, including aquifer replenishment. Water resource management implies the target of distributing and using water as efficiently as possible.
The reserves that were previously exploited must be used in a sustainable manner with special attention to the fight against pollution and the deterioration of quality and protection against the depletion of aquifers. The government has adopted a dual approach based on demand management and supply management. Water resources will primarily be used for basic human needs with 100 litres of water per person per day predominantly reserved for domestic uses.

The Executive Development Program defined by the Ministry of Planning and International Cooperation (MoPIC) confirms the priority given to water over the next three years, as this sector accounts for 17% of total investment expenditure, ahead of transport (13%) and energy (10%).

While there has been progress on some components of the water strategy (particularly in reducing network losses thanks to considerable donor support), these efforts would appear to be inadequate with regard to the challenges facing the sector and little headway has been made on issues related to governance (sector regulation, tariff setting, empowerment of distribution companies, creation of the National Water Council, ministry reforms...).

At the institutional level, the definition of the sectoral policy comes under the responsibility of the Ministry of Water and Irrigation (MWI). Two entities are responsible for the implementation of this policy: 1) the Water Authority of Jordan (WAJ), an autonomous establishment in charge of planning resources and national production infrastructure, authorisations for groundwater abstraction and nationwide drinking water supply and sanitation; 2) the Jordan Valley Authority (JVA), which is responsible for the development, use and protection of resources in the Jordan Valley.

The Ministry of Water and Irrigation is planning to improve groundwater resource management as one solution to address this dramatic situation. Groundwater is the primary source of freshwater (405 million m$^3$ in 2010, i.e. 45% of total resources) and the Dead Sea Basin, which the project concerns, is the second largest groundwater reservoir with an annual renewable potential estimated at 40-50 million m$^3$. However, this potential is currently threatened by an overexploitation of the aquifer (60%). The risk of a deterioration of water quality is also poorly assessed due to the extremely limited knowledge of water transfers between the wadis and the Dead Sea Basin aquifers.

**1.3 - Importance for the country**

The situation of the Kingdom’s water resources is a major constraint to the development of all economic activities. It is therefore essential to learn more about the use of groundwater resources and to be able to simulate it in order to establish a more efficient and optimised management of these resources and, especially, to avoid an unsustainable exploitation of this scarce and limited resource.
1.4 - Contribution to the strategic orientations of French and AFD aid

1.4.1 - Lessons learned from the main activities of AFD and other French aid actors in the sector

AFD has made water one of its main activity sectors in Jordan and operates by both financing investments and supporting and assisting demand management policies:

- financing the Jordanian government’s contribution to the project to exploit the Disi aquifer for Amman’s water supply (USD 100m sovereign loan, agreement of May 2009). At the same time, PROPARCO has allocated a USD 100m loan to the private company in charge of project implementation. EIB is cofinancing this project (which has a total cost of roughly USD 1bn) with equivalent amounts and mechanisms.

- contribution to financing a feasibility study and environmental and social impact assessment for the Red Sea-Dead Sea water conveyance project (EUR 2m grant allocated in 2006 to the trust fund managed by the World Bank, together with a EUR 1m French GEF contribution). The studies are currently in the process of being validated.

- financing for a project to optimise irrigation in the Jordan Valley (EUR 2.7m grant allocated in 2007). The project, which follows on from a pilot project conducted by the Regional Water and Agriculture Mission (MREA), has been active since February 2008 (service provider: Société du Canal de Provence, in partnership with MIRRA - Methods for Irrigation and Agriculture -, the entity created as a continuation of MREA).

- conducting of a study, under a regional programme on water demand management policies in the Mediterranean housed within the Marseille Centre for Mediterranean Integration. It aims to introduce an economic approach to the water policy in order to prioritise the various measures envisaged (finalized end of 2011, EUR 0.16m).

- Finally, AFD is participating (as a member of the Steering Committee) in an initiative launched by the MWI with support from GIZ. It involves creating a participatory forum, the Highland Water Forum, with the aim of promoting the development of the Highland region’s economy (including the Azraq oasis) towards new activities that consume less water. The French Ministry of Foreign and European Affairs (MAEE) has also provided a technical assistant to the Highland Water Forum.

Despite the fact that AFD’s operations are relatively recent compared to long-standing donors in the sector (USAID, German and Japanese cooperation), they are visible in terms of their strategic importance (Disi project) or more institutional importance, with our studies and technical assistance projects which are closely followed by the highest levels of the MWI.

On groundwater, BRGM has provided technical assistance for the modelling of deep aquifers in the Kingdom. This project was financed by an AFD grant (EUR 400,000). It reached completion in late 2010 and identified new practical possibilities to be explored. The Ministry of Water and Irrigation requested AFD to pursue this technical cooperation for the Dead Sea’s shallow aquifers, which are one of the priority potential resources to have been identified.
1.4.2 - Contribution to the strategic orientations of French and AFD aid

The water sector, with its various dimensions, is a priority for AFD Group: resource management, environmental aspects, international waters, drinking water supply and sanitation, agricultural water...

Given the importance of this sector in Jordan, it was naturally selected as a priority area for operations as soon as AFD was authorised to operate in Jordan in 2003. This priority was reconfirmed in the Memorandum of Understanding (MoU) signed on 27 July 2011 between the Minister of Planning and International Cooperation and the Chief Executive Officer of AFD.

The present project will allow AFD to gain a better understanding of the sector and of Jordanian stakeholders in the field of groundwater.

II – THE PROJECT (PROGRAMME)

2.1 - Objective

The project aims to establish a more efficient management of groundwater resources in order to avoid an unsustainable overexploitation of this limited resource and, consequently, to better meet demand.

2.2 – Specific objectives

The main aim of the project is to complete the hydrogeological model of Jordan’s deep aquifers with a better understanding of the exchanges with the wadis surrounding the Dead Sea and their associated aquifers, which are the main outlets. In addition, investigations of the Dead Sea Basin shallow aquifers allow a better estimation of available resources, as well as abstraction management rules that respect the sustainability of these resources to be defined. Along with the development of the model, the project will train Jordanian technicians in how to use the model and will integrate it in the Ministry of Water and Irrigation’s water resources management tool (WEAP).

2.3 - Project (programme) content

The project will include four phases and is expected to be implemented over an 18-month period:

- Phase 1: Collection and analysis of field data: inventory of the main water sources and estimation of their geological parameters, measurement of the flows in wadis, analysis of the “age” and quality of water, its chemical profile…

- Phase 2: Measurement of the water level of the deep wells in the Dead Sea Basin and calibration of the hydrogeological model with the data collected. The aim is to verify
whether the simulations made confirm the measurements of groundwater flows along the main wadis. This work will provide a better understanding of the discharge mechanisms of deep aquifers and their sensitivity to the quantitative and qualitative problems observed in the wadis.

- Phase 3: Modelling of the Dead Sea Basin shallow aquifers and development of 25-year scenarios on the evolution of resources depending on the different exploitation hypotheses; adaptation of the model to the Ministry of Water and Irrigation’s GMS-Modflow environment and integration in the WEAP water resources management tool. This work will establish exploitation rules for the most accessible surface resources to ensure that they are properly renewed.

- Phase 4: Preparation of the final report and summary; training in how to use the model for Ministry of Water and Irrigation staff.

2.4 – Intervenors and operating method

The Ministry of Water and Irrigation (MWI – Groundwater Directorate) will be the executing agency. The service provider will be recruited through a call for tenders.

2.5 - Cost and financing plan

The total project cost is estimated at EUR 315,000. The national counterpart (Ministry of Water and Irrigation) will mainly be in the form of human resources and the provision of data on the Kingdom’s geology and hydrogeology.

2.6 - Type and justification of financial product provided by AFD

The operation will be financed by a grant given the fact that it involves an intellectual service with no tangible investment.

III – PROJECT (PROGRAMME) IMPACT ASSESSMENT

3.1 – Expected project (programme) impacts

3.1.1 - Economic impacts

The expected economic impacts are indirect. However, they concern the improvement in groundwater management in general and in the Dead Sea Basin in particular, in order to ensure there is sustainable exploitation.

3.1.2 – Environmental impacts

The project is expected to provide a better understanding of the risks of surface water and groundwater contamination related to the development of agriculture and irrigation (use of pesticides, chemical fertilizers).
3.1.3 - Institutional impacts

Development of the management skills of the Ministry of Water and Irrigation Department in charge of groundwater and of the sectoral dialogue with ministries.

3.1.4 – Sustainability of project (programme) impacts

The result of the direct intellectual service will continue to be available to the authorities concerned once the report has been submitted. Moreover, the development of the skills of the Ministry of Water and Irrigation staff will be sustainable in terms of the quality of projects managed by this Ministry in the future.

3.2 – Environmental and social risks

No environmental and social risk has been identified at this stage.

3.3 – Other negative externalities

None identified at this stage.

IV – SUPERVISION-EVALUATION MECHANISM AND INDICATORS

4.1 - Supervision-evaluation mechanism

It is planned for three intermediary reports corresponding to Phases 1 to 3 of the programme to be submitted, as well as the submission of a final report and summary in Phase 4 of the programme.